Name: ____________________ Date: ____________

Polynomial Factoring solution (version 641)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 6x + 23 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(23)}}{2(1)}$$

$$x = \frac{-(-6) \pm \sqrt{36 - 92}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{-56}}{2}$$

$$x = \frac{6 \pm \sqrt{-4 \cdot 14}}{2}$$

$$x = \frac{6 \pm 2\sqrt{14}\, i}{2}$$

$$x = 3 \pm \sqrt{14}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $6 + 3i$ and $5 - 9i$ in standard form ($a + bi$).**

Solution

$$(6 + 3i) \cdot (5 - 9i)$$

$$30 - 54i + 15i - 27i^2$$

$$30 - 54i + 15i + 27$$

$$30 + 27 - 54i + 15i$$

$$57 - 39i$$

Polynomial Factoring solution (version 641)

3. **Write function** $f(x) = x^3 + 2x^2 - 21x + 18$ **in factored form. I'll give you a hint: one factor is** $(x-3)$**.**

Solution

$$\begin{array}{r|rrrr} & 1 & 2 & -21 & 18 \\ 3 & & 3 & 15 & -18 \\ \hline & 1 & 5 & -6 & 0 \end{array}$$

$$f(x) = (x-3)(x^2+5x-6)$$

$$f(x) = (x-3)(x+6)(x-1)$$

4. **Polynomial** p **is defined below in factored form.**

$$p(x) = -(x+8)^2 \cdot (x+4)^2 \cdot (x-1) \cdot (x-4)$$

Sketch a graph of polynomial $y = p(x)$**.**